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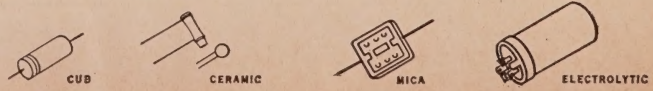

SOME SPECIAL-PURPOSE RC CIRCUITS

Resistance-capacitance networks are of interest and importance in electronic circuitry because of their compactness and comparative simplicity. Unlike LC circuits, RC networks ordinarily neither radiate nor pick up interference. This feature often decides their selection, although LC circuits afford notably sharper response characteristics in the same application.

Since both resistors and capacitors are obtainable commercially in a very wide variety of values, suitable combinations are assembled quite readily.

The **"C-D Capacitor"** has offered descriptive material on RC circuits previously.[1] Reader response has indicated, however, that a practical discussion of further circuit details is desirable.

Timing Circuits

The d. c.-actuated timing circuit is one of the simplest applications of the RC combination. Nevertheless, these timing elements are to be found in numerous electronic devices. They are known also as time-delay elements.

RC timing circuits take two forms. In the first type, the output voltage reaches its maximum steady value at some time after a d. c. operating voltage is applied. A common name for this type is **delayed make circuit.** Its operation results from the slow charging of a capacitor through a series resistor.

In the second type, output voltage decays to some low value sometime after the d. c. supply voltage has been interrupted. A common name for this type is **delayed break circuit.** Its operation results from the slow discharge of a capacitor through a shunt resistor.

Figure 1 illustrates these two types of timing circuits. In Figure 1(A), capacitor C begins to charge exponentially through resistor R as soon as switch S is closed, and reaches full charge at some time later governed by the product RC. Here, R is in ohms, C in farads, and the time interval (t) in seconds.

In Figure 1(A), the output voltage is the capacitor voltage, since the

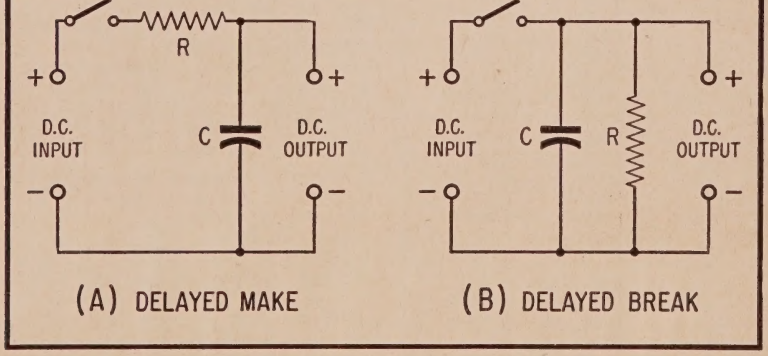

Fig. 1. Basic RC Timing Circuits.

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output terminals are connected directly across the capacitor. The output voltage accordingly progresses exponentially from zero to a maximum according to the capacitor charging rate.

Figure 1(B) shows the delayed break circuit. When switch S is closed, capacitor C charges instantaneously to the level of the d. c. input voltage and this voltage appears at the output terminals as long as S remains closed. When S is opened, capacitor C discharges exponentially through resistor R at a rate determined by the RC time constant. The output voltage therefore decays at the same rate.

Each of these timing circuits is satisfactory only for feeding into high-impedance loads. Low-impedance loading demands appreciable output current which, in turn, degrades the timing action of the circuits. It is common to present the timing-circuit output voltage to vacuum-tube inputs. Examples of such circuitry may be found in earlier issues of "THE CAPACITOR."[2]

Figure 2 is a simple table for determining the RC time constant of the circuits of the type shown in Figure 1.

TIME CONSTANT TABLE

C (ufd.)	R (ohms)	t (secs.)
1	1000	0.001
1.5	1000	0.0015
2	1000	0.002
2.5	1000	0.0025
3	1000	0.003
3.5	1000	0.0035
4	1000	0.004
4.5	1000	0.0045
5	1000	0.005
5.5	1000	0.0055
6	1000	0.006
6.5	1000	0.0065
7	1000	0.007
7.5	1000	0.0075
8	1000	0.008
8.5	1000	0.0085
9	1000	0.009
10	1000	0.01

Fig. 2.

The time constants correspond to the number of seconds required for the output voltage to increase in Figure 1(A) to a value equal to 63 per cent of the input voltage, or to fall in Figure 1(B) to a value equal to 37 per cent of the input voltage. The Table has been set up to read in convenient practical units: microfarads, ohms, and seconds.

All of the time constants for capacitors (C) between 1 and 10 ufd. are given for a resistance (R) of 1000 ohms. For a different value of resistance (R_1), in ohms, multiply t, as obtained from the Table, by R_1/R. For a different value of capacitance (C_1), in microfarads, multiply t, as obtained from the Table, by C_1/C. When both R and C are different from any of the values given in the Table, multiply the tabular value of t for 1 microfarad by $C_1/C(R_1/R)$.

RC High-Voltage D. C. Supply

Certain ultra-compact, portable Geiger counters utilize a special adaptation of the circuit in Figure 1(B) to supply the high d. c. voltage (usually 900 to 1000 volts) required by the GM tube in such units.

In principle, capacitor C is charged from a high-voltage d. c. or unipolarity pulse by momentarily depressing switch S. The high voltage charges the capacitor instantaneously. This charge then supplies the small current of the GM tube, the latter being represented by a high resistance R. Since the current drain is slight, a high capacitance at C can supply high voltage for appreciable operating intervals. The charge is replenished by repeated closures of the switch.

Several ingenious adaptations of this simple operating principle have appeared in commercial and experimental instruments. In one unit, the high-voltage charging source is a rectifier and transformer, the latter having a very high step-up turns ratio. A small dry cell supplies the primary pulse through a finger-operated microswitch or through a pendulum switch actuated by the operator's walking

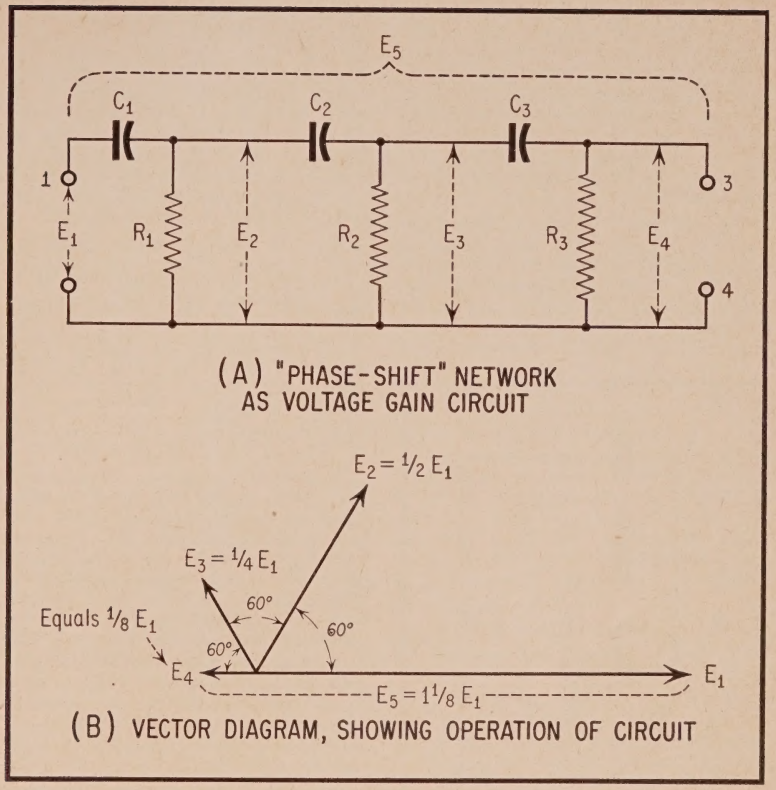

Fig. 3. Illustration of Voltage Gain in RC Circuit.

movements. In another unit, capacitor C actually is a combination of capacitors charged in parallel from a lower-voltage battery and then, by switching, connected in series to produce a total high voltage.

RC Voltage Amplifiers

It is quite common, and understandably so, to associate RC networks with attenuation. Since they are by nature step-down circuits, we think of them automatically as loss producers, and we tolerate this annoying shortcoming only because RC circuits offer a simple way of obtaining certain desired results.

The casual reader is not acquainted, however, with the fact that certain RC networks not only introduce **no** loss at particular frequencies but actually provide voltage gain.

While these curious RC networks with greater than unity gain, first were described in American journals[3,4], they seem not to have attracted so much subsequent serious attention on this side of the Atlantic as they have in England, where they appear to be undergoing a respectable amount of exploitation.[5,6,7]

The amplifying RC network depends for its operation upon the fact that a frequency-selective RC circuit may show considerable attenuation at its **conventional** output terminals, but will deliver an output voltage exceeding the input voltage if the output is taken instead, between two points in the circuit which are in 180-degree phase relationship.

Several such circuits exhibit this property. Space will not permit a resume of all of them on these pages and the reader is referred to the bibliography at the end of this article for sources giving more extensive treatment of the subject. However, the

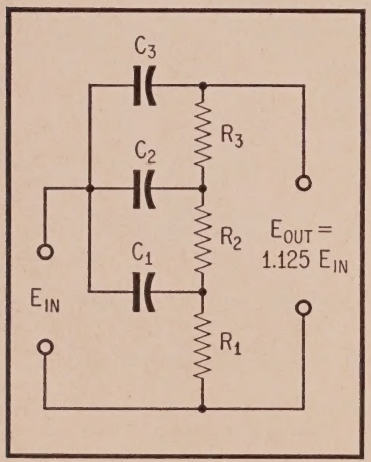

Fig. 4. Roddam's Rearrangement of the "Phase-Shift" Circuit of Figure 3(A).

circuits in Figures 3 and 4 will serve to illustrate the principle.

The circuit in Figure 3(A) is the familiar 3-leg phase-shift network often used in single-frequency RC audio oscillators. At one frequency, each section (C_1R_1, C_2R_2, and C_3R_3) introduces a 60-degree phase shift. The normal output voltage, E_4, thus is 180° out of phase with the input voltage, E_1.

Each leg halves the voltage presented to it. Thus; $E_2 = \frac{1}{2}E_1$, $E_3 = \frac{1}{2}E_2$, and $E_4 = \frac{1}{2}E_3$. Also, $E_4 = \frac{1}{8}E_1$. In order that each RC section may offer negligible loading to the preceding section, R_2 is selected much larger than R_1, and R_3 much larger than R_2. But C_1R_1 is kept equal to C_2R_2 and C_3R_3. However, the output voltage, E_4, normally taken at terminals 3-4, is seen to be $0.125E_1$, the input voltage applied to terminals 1-2.

Now it is seen easily from the vector diagram (Figure 3B) that the conventional output voltage, E_4 while attenuated, is in 180° phase relationship with the input voltage, E_1. Terminal 3 accordingly is negative when terminal 1 is positive. It is clear then that if the output is taken instead between terminals 1 and 3, the new output voltage, E_5, (vectors E_4 and E_1), will be $1\frac{1}{8}$ times the input voltage.

Numerous ingenious arrangements have been worked out and have been tested in the laboratory, wherein several voltage-amplifying RC networks have been cascaded to afford greater gain. Bacon and Salmon[5] developed a 3-stage circuit, in which each network imposed negligible loading upon the preceding one, with a calculated gain of 1.98 at 640 cycles and a measured gain of 1.67. Epstein[4] has set 2 as the maximum voltage gain possible with RC networks, but Bacon and Salmon believe the gain to be theoretically unlimited.

Aside from the low value of voltage step-up afforded, the circuit in Figure 3(A) has the disadvantage that the input and output have no common terminal. Grounding difficulties might arise with an arrangement of this sort when applied practically. Roddam[7] has rearranged this circuit in the manner shown in Figure 4, to give the desired common ground, without reducing the voltage gain of 1.125.

Capacitance and resistance values are selected for the voltage-amplifying RC network in the same manner as for a conventional frequency-selective RC circuit. For example: In the phase-shift-type circuit (Figures 3A and 4),

(1) $C_1 = C_2 = C_3 = 10^6/(6.28\ f\ R \tan \theta)$
and
(2) $R_1 = R_2 = R_3 = 10^6/(6.28\ f\ C \tan \theta)$

In each case, f is in cycles, R in ohms, and C in ufd. For 60° phase shift per RC leg, these equations simplify to:

(3) $C = 10^6/(10.88\ f\ R)$
and
(4) $R = 10^6/(10.88\ f\ C)$

RC networks with greater than unity gain offer interesting possibilities of application in single-frequency circuits in which a modest voltage step-up is desired without recourse to transformers, tubes, transistors, magnetic, or dielectric amplifiers. They are also of use in interstage coupling in conventional single-frequency control amplifiers. These circuits already have been employed to augment tube operation. For example, both Roddam[7] and Dunn[6] have developed cathode-follower vacuum-tube oscillators in which amplifying RC networks are used to overcome the less-than-unity gain of the cathode follower.

Non-Linear Elements in RC Circuits

So far, only linear capacitors and resistors have been considered in this discussion of RC applications. It is interesting to note the modified operation resulting from the substitution of non-linear R and C components.

A typical non-linear resistor is Thyrite. A typical non-linear capacitor is the new voltage-sensitive ceramic unit made especially for dielectric amplifiers. Both components change their characteristics with applied voltage. The resistance of Thyrite decreases non-linearly as current through it increases. The capacitance of a voltage-sensitive capacitor decreases non-linearly as the applied voltage increases.

A frequency-selective RC network, such as the Wien bridge or parallel-T null circuit[1], ordinarily is not affected by signal-voltage amplitude. If a suitable complement of Thyrite resistors is used in such a network, however, the circuit will become voltage-sensitive, as well as frequency-sensitive. In single-frequency applications, this leads to an intriguing voltage-selective circuit, affording a trapping-out of a small band of voltages and transmission of all higher and lower values.

Somewhat similar action may be obtained by employing non-linear capacitors and conventional linear resistors. Here again, the designed network response characteristic is obtained only at that input voltage level at which the non-linear elements have the design values (capacitance in this instance). At higher and lower voltages, the network is "detuned" automatically.

High-pass, low-pass, and complex RC filters also may be made voltage-selective by employing a non-linear resistance or capacitance.

Voltage-selective RC circuits offer possibilities of application in single-frequency circuits where a simple means may be desired for suppressing or transmitting certain voltage levels. End results might include apparatus control, equipment protection and similar actions.

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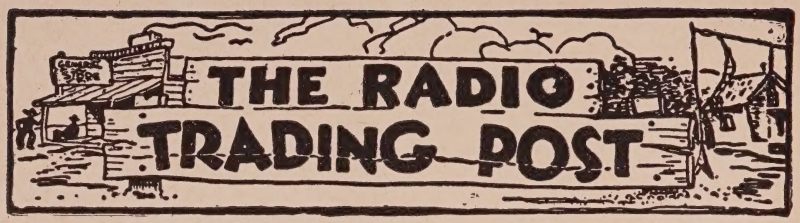

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FOR SALE — Make offer for large selection of radio and general broadcasting books. Harold Sinski, 309 Cleveland Ave., Harrison, N. J.

FOR SALE — Used radio tubes in good cond.: No. 201 — 10 cents; 24 and 26 — 25 cents; 27 — 20 cents; 35-51 — 35 cents; 71 — 30 cents; 80 — 35 cents. Pete's Radio Supply, 57 Lakeview Ave., Lowell, Mass.

SWAP — 1940 Buick radio, 1/3 HP motor; RCA voltohmyst Jr. (about 1946); NRI multitester (less batteries). Want light outboard motor, gasoline engine or ?? Cass Radio and TV, 840 Cass Avenue, Kingsford, Mich.

WANT — GI tape and disc recorder unit, RCP 8873A Servishop, or 808A, model 730 Universal signaliner, binoculars, movie camera and projector. Have list of good trades or cash. Bob Robinson, 612 Charlotte St., Utica 2, N. Y.

WANTED — McMurdo-Silver 906 sig. gen.; 909 sweep gen.; and Jackson 641 sig. gen. M. Emke, 4508 Broadway, Chicago 40, Ill.

SELL OR TRADE — Nikon camera with Nikkor f1.4 lens, spotless, $240 or will trade for high-grade SX62, Hickok 539A. Al Werhan, Box 142, Manlius, N. Y.

FOR SALE — Riders Vols. 1 to 5 abridged, vols. 7 to 14, asking $6 each. Frank's Radio Service, 140 East Cooke Avenue, Glenolden, Pa.

SELL OR TRADE — NRI radio-TV comm. course, 78 lessons, less kits, $25; Silver Marshal absorption wavemeter, model 903, and Field Strength meter, model 903A, coils from 3500 Kc., 300 Mc., $15; or swap both for small outboard motor. William Tietz, 1610 Mahan Ave., Bronx 61, N. Y.

SWAP — Hi-powered binoculars, 16 x 50, for good commercial receiver or marine receiver. Joseph Malak, Center Road, Chesterland, Ohio.

FOR SALE — NRI correspondence course; Sams vols. 1-14; radio testing equip., tubes, small parts, $500 takes all. Write for complete description. Jim Griffith, 409 East 10th St., Aledo, Ill.

FOR SALE — RCA 5TP4 projection tube, $5; RCA 30 K volt flyback transformer with matching yoke, $5, or all for $9. H. Bergh, 1583 East 96th St., Brooklyn 36, N. Y.

FOR SALE — Hickok Electronic volt-ohm-capacity-milliammeter, model 203, guaranteed. $40 or trade for what have you? J. Bevona, 222 Verona St., Rochester, N. Y.

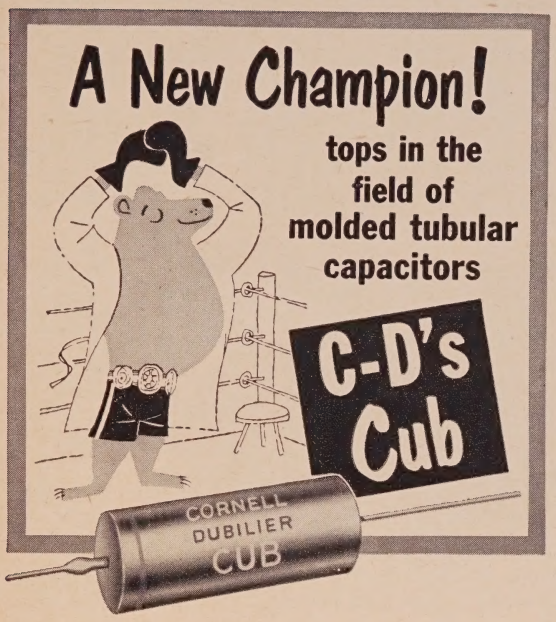
FOR SALE — Riders manuals 6 to 11; Simpson ant. compass model 351; Philco dynamic tester model 730; Dual TV Philco chassis, model 51-1834, in good cond. Payad Radio and Television, 125 East Main St., Staunton, Ill.

FOR SALE — Simpson Genescope model 480 (4 instruments in one): AM oscillator, crystal calibrator, FM oscillator, scope, in orig. carton, cash only, $275. Howell Radio Co., 122 N. 9th St., Waco, Tex.

FOR SALE — Complete NRI transmitter with modulator unit and power supply, plus complete NRI comm. course. Both for $50. C. K. Eser, 2221 East Lombard St., Baltimore 31, Md.

MOLDED TUBULAR CAPACITORS

"The CUB"



The Cornell-Dubilier "CUB" is an *outstandingly superior* molded capacitor unequaled by any molded tubular heretofore developed.

The "CUB" possesses characteristics that will meet the wide and demanding applications found in critical industrial, military and experimental electronic equipment.

This is **the** unit recommended for general replacement service.† Sold exclusively through C-D electronic parts Distributors.

The "CUB" is molded in extra hard, non-inflammable bakelite—tough, durable and exceptionally resistant to moisture, high temperature and shock.

The unit is processed by special vacuum—temperature—cycling impregnation—the 200 and 400 volt series are impregnated with HT compound and the 600 volt and up series are impregnated with oil (Dykanol "C").

In countless production test runs, the "CUB" has survived an average of 30 cycles of the punishing JAN and MIL Temperature and Immersion Cycling Test.

The "CUB" is dry assembly processed and sealed immediately *after* impregnation. This technique results in life long high insulation resistance, low power factor, and exceptional capacitance stability. Each unit is tested at several times its rated voltage to insure high dielectric strength.

At least a 50% greater resistance to humidity and a 15%-25% greater voltage breakdown over comparable molded tubulars, is built into the C-D "CUB".

Extra strong copper-weld leads eliminate breakage during assembly and throughout service life. The leads are solder sealed securely to the unit.

TEMP. RANGE: HT Compound —40°C to +90°C
Dykanol "C" —55°C to +100°C

THE CUB

CUB Cat. No.	Cap. Mfd.	Size—Inches Dia. x Length	List Price	Net Price
		200 V. D.C.		
CUB 2S2	.02	3/8 x 1	$.25	**$.15**
CUB 2S47	.047	7/16 x 1 1/4	.25	**.15**
CUB 2S5	.05	7/16 x 1 1/4	.25	**.15**
CUB 2P1	.1	7/16 x 1 1/4	.35	**.21**
CUB 2P15	.15	9/16 x 1 1/2	.35	**.21**
CUB 2P22	.22	11/16 x 1 7/8	.40	**.24**
CUB 2P25	.25	11/16 x 1 7/8	.40	**.24**
CUB 2P47	.47	11/16 x 1 7/8	.60	**.36**
CUB 2P5	.5	11/16 x 1 7/8	.60	**.36**
CUB 2W1	1.0	3/4 x 2 1/4	.90	**.54**

†For units specially recommended in industrial applications see "BUDROC" Steatite-Cased Capacitors.

THE CUB

CUB Cat. No.	Cap. Mfd.	Size—Inches Dia. x Length	List Price	Net Price
		400 V. D.C.		
CUB 4S1	.01	3/8 x 1	$.25	**$.15**
CUB 4S2	.02	7/16 x 1 1/4	.25	**.15**
CUB 4S22	.022	7/16 x 1 1/4	.25	**.15**
CUB 4S47	.047	7/16 x 1 1/4	.30	**.18**
CUB 4S5	.05	7/16 x 1 1/4	.30	**.18**
CUB 4S68	.068	9/16 x 1 1/2	.35	**.21**
CUB 4P1	.1	9/16 x 1 1/2	.35	**.21**
CUB 4P15	.15	11/16 x 1 7/8	.35	**.21**
CUB 4P22	.22	11/16 x 1 7/8	.40	**.24**
CUB 4P25	.25	11/16 x 1 7/8	.40	**.24**
CUB 4P47	.47	3/4 x 2 1/4	.60	**.36**
CUB 4P5	.5	3/4 x 2 1/4	.60	**.36**
***ST 4W1**	1.0	1 x 2 7/8	.90	**.54**
		600 V. D.C.		
CUB 6T1	.0001	3/8 x 1	.25	**.15**
CUB 6T25	.00025	3/8 x 1	.25	**.15**
CUB 6T4	.0004	3/8 x 1	.25	**.15**
CUB 6T5	.0005	3/8 x 1	.25	**.15**
CUB 6D1	.001	3/8 x 1	.25	**.15**
CUB 6D15	.0015	3/8 x 1	.25	**.15**
CUB 6D2	.002	3/8 x 1	.25	**.15**
CUB 6D22	.0022	3/8 x 1	.25	**.15**
CUB 6D3	.003	3/8 x 1	.25	**.15**
CUB 6D33	.0033	3/8 x 1	.25	**.15**
CUB 6D4	.004	3/8 x 1	.25	**.15**
CUB 6D47	.0047	3/8 x 1	.25	**.15**
CUB 6D5	.005	3/8 x 1	.25	**.15**
CUB 6D6	.006	7/16 x 1 1/4	.25	**.15**
CUB 6D68	.0068	7/16 x 1 1/4	.30	**.18**
CUB 6S1	.01	7/16 x 1 1/4	.30	**.18**
CUB 6S15	.015	7/16 x 1 1/4	.30	**.18**
CUB 6S2	.02	7/16 x 1 1/4	.30	**.18**
CUB 6S22	.022	7/16 x 1 1/4	.30	**.18**
CUB 6S3	.03	7/16 x 1 1/4	.35	**.21**
CUB 6S33	.033	9/16 x 1 1/2	.35	**.21**
CUB 6S4	.04	9/16 x 1 1/2	.35	**.21**
CUB 6S47	.047	9/16 x 1 1/2	.40	**.24**
CUB 6S5	.05	9/16 x 1 1/2	.40	**.24**
CUB 6S6	.06	11/16 x 1 7/8	.40	**.24**
CUB 6S68	.068	11/16 x 1 7/8	.40	**.24**
CUB 6P1	.1	11/16 x 1 7/8	.45	**.27**
CUB 6P2	.2	3/4 x 2 1/4	.55	**.33**
CUB 6P22	.22	3/4 x 2 1/4	.55	**.33**
CUB 6P25	.25	3/4 x 2 1/4	.55	**.33**
***ST 6P5**	.5	1 x 2 7/8	.80	**.48**
		1600 V. D.C.		
CUB 16T5	.0005	7/16 x 1 1/4	.65	**.39**
CUB 16D1	.001	7/16 x 1 1/4	.65	**.39**
CUB 16D15	.0015	7/16 x 1 1/4	.65	**.39**
CUB 16D2	.002	7/16 x 1 1/4	.65	**.39**
CUB 16D22	.0022	7/16 x 1 1/4	.65	**.39**
CUB 16D3	.003	7/16 x 1 1/4	.65	**.39**
CUB 16D33	.0033	7/16 x 1 1/4	.65	**.39**
CUB 16D4	.004	7/16 x 1 1/4	.65	**.39**
CUB 16D47	.0047	7/16 x 1 1/4	.65	**.39**
CUB 16D5	.005	7/16 x 1 1/4	.65	**.39**
CUB 16D6	.006	9/16 x 1 1/2	.65	**.39**
CUB 16D68	.0068	9/16 x 1 1/2	.65	**.39**
CUB 16D7	.007	9/16 x 1 1/2	.65	**.39**
CUB 16D75	.0075	9/16 x 1 1/2	.65	**.39**
CUB 16D8	.008	9/16 x 1 1/2	.65	**.39**
CUB 16S1	.01	9/16 x 1 1/2	.70	**.42**
CUB 16S15	.015	9/16 x 1 1/2	.70	**.42**
CUB 16S2	.02	11/16 x 1 7/8	.70	**.42**
CUB 16S22	.022	11/16 x 1 7/8	.70	**.42**
CUB 16S3	.03	11/16 x 1 7/8	.70	**.42**
CUB 16S4	.04	3/4 x 2 1/4	.70	**.42**
CUB 16S5	.05	3/4 x 2 1/4	.70	**.42**
		6000 V. D.C.		
CUB 60T5	.0005	9/16 x 1 1/2	1.35	**.81**
CUB 60D1	.001	9/16 x 1 1/2	1.35	**.81**
CUB 60D5	.005	11/16 x 1 7/8	1.35	**.81**
		10,000 V. D.C.		
CUB 100T5	.0005	11/16 x 1 7/8	1.50	**.90**
		12,500 V. D.C.		
CUB 125T25	.00025	11/16 x 1 7/8	1.70	**1.02**

*Furnished as a "BUDROC" unit.

SALE OR TRADE — Sams folders 1 to 10 in binder; single folders 53, 57, 93, 113, 118, 157. Best offer. G. H. Swiska, 109 East School St., Woonsocket, R. I.

SELL OR SWAP — S-39 EC.2 S.W. sets; Wilcox-Gay disc recorder and radio phono with mike; GE FM tuners, 42-50 Mc.; GE AM-FM 5-band set; Spartan AM-FM set; 7" Admiral TV; Knight 15 w. amp.; test equip. John Broniszewski, 1523 W. Wabansia Ave., Chicago 22, Ill.

SWAP — Perfect: 1N21B, 1N28, 1652, 359A, CHS 7248, 956, 9002, X222, 24A, D227, 245, 345, 326, 327, l. n. telephonics phones with tip plug cords TH37. Want test equip. or tools. Peter Carriero, 2260 Haviland Ave., Bronx 62, N. Y.

FOR SALE — Electric motor-driven Instructograph, in good cond., with 5 tapes for code practice, $24, or best offer. H. Miess, 1128 Cheyenne Drive, Cincinnati 16, Ohio.

WANTED — Operator's manual and parts list for Dumont 3" oscillograph, model 164E. Will pay cash. Want manual even if parts list is not available. Derry's Radio Shop, King's Mountain, Ky.

SELL OR TRADE — Heathkit TS2 TV alignment gen., assembled but never used, $25, or trade for battery eliminator to bench test auto radios. Clifford Tenney, 124 - 01 9th Ave., College Point 56, N. Y.

FOR SALE — Hallicrafters 6-tube receiver, 540 Kc. to 30 Mc., A-1 cond.; two 746B tuning units with Xtals, mikes, 28 v. DC 8 oz. motors, S.W. coils; IF transformers and chokes; S.W. condensers. E. O. Cole, 929 N. LeClaire Ave., Chicago 51, Ill.

FOR SALE — "Mod. Oscilloscopes and Their Uses," by Jacob Ruiter, $3.50; "UHF Radio Simp.," Kiver, $2.50. L. Matushefske, 2 Elmont Rd., Elmont, L. I.

FOR SALE — Precision CR30, $75; Precision scope ES-500A with SP5 probes, almost new, $150 complete; Approved A-200 sig. gen., $25. All exc. cond. Aloys Neussendorfer, 956 Cameron Ave., Pontiac, Mich.

SELL OR SWAP — Precision E200, Simpson 260, Hickok 450, Weston 722, Heathkit 6 v. eliminator, Motorola 800, Mercury '49 car radios, obsolete tubes. What have you? The Radio Shop, 213 Dryden Rd., Ithaca, N. Y.

FOR SALE — Emerson 546 table model radio-phono combination, record changer plays 78 RPM 10" and 12" records, $25. Jack Israel, 296 Wainwright St., Newark 8, N. J.

FOR SALE — Several used radio-TV textbooks. List on request. Robert Fellows, Caledonia, N. Y.

SELL OR SWAP — Radio books; old and l. n. used tubes; speaker frames; used radios; 3-way GE portable VOM meter with case; 500 ohm 10 w. resistors. Joseph Janata, 2510 21st St., Astoria, L. I. City 2, N. Y.

WANTED — Relay rack for standard 19" panels, preferably 61" to 71" high. Need not be perfect if priced right. Cecil Warner, Argos, Ind.

FOR SALE — R27 ARC 5, 6-9.1 Mc receiver, unconverted; BC-459A, 7-9.1 Mc. transmitter, unconverted, $15 ea., plus shipshipping charges. Both with diagrams ping charges. Both with diagrams and conversion data. John J. Lelis, 59-06 Linden St., Brooklyn 27, N. Y.

WANTED — TV set 8" or larger in good cond., will pay $10 or $15. Sal Isgro, 118 Gamewell St., Hackensack, N. J.

WANTED — 50 w. modulation transformer; TU47 tuning unit, ham parts. Will trade complete radio course, Audels Refrigerator Guide, Tobe condenser tester, 3 gal. Electric water heater, trailer type. Frank Carlson, Aledo, Ill.

FOR SALE — Viking I transmitter in good operating cond., complete with tubes, $200; Sonar XE-10 exciter, $12. J. Pyryt, 322 Ross, Rd., Paramus, N. J.

SELL OR TRADE — NRI servicing, and NRI comm. course; TV booster; books; tubes; parts. Want used watches and clocks. Need not be in running cond. Merhl Weagley, Lantz, Md.

FOR SALE — QST, 1948-1953, all l. n., $2 per year or all for $10 plus shipping charges; Electro-Voice 600C hand mike with switch, good cond. Any reasonable offer accepted. C. G. Stuart, 141 Whiting St., Toledo 9, Ohio.

SELL — NC-125 with speaker, $125; WE 754A loudspeaker in cabinet; 3E29's; 80' Belden 8432 dual shielded. Want ham gear, camera, binoculars. T. H. Mackintosh, Elon College, N. C.

FOR SALE — Hickok model 610A TV sig. and marker gen.; Supreme 546 3" scope. Both A-1 cond. Owego Radio, 34 Lake St., Owego, N. Y.

WANTED — Small 10" and 12" TV sets in working order. Will pay cash or trade portable typewriter, adding mach., 35 mm. camera, 16 mm. movie camera. E. Bridges, 217 Lineberger St., Shelby, N. C.

SELL OR TRADE — Riders 1 to 12 in good cond., $35 FOB, or trade for TV. C. J. Schexnayder, 200 Shreveport Ave., Port Arthur, Tex.

WANTED — Hickok Traceometer. State cond. and price. C. S. Wood, South Berwick, Me.

SELL OR TRADE — 40' tower, two-bay antenna, Channel 4, 5, 6; 4-stage booster and rotator; two 45 RPM players, need adjusting. Want Sams folders 1 to 241, used 21" TV or cash. Laugeness, 1012 13th St., North, Moorhead, Minn.

SELL OR SWAP — Back dated servicing magazines: Technician, Television Retailing, Radio-TV Service Dealer, Radio Electronics, Service; and Sams Photofact Index. J. X. Gunzelman, 2808 Chesley Ave., Baltimore 14, Md.

WANTED — Gonset Communicator, must be in exc. cond. Alan I. Alford, 107 University Rd., Brookline 46, Mass.

SWAP OR SELL — Photographic or lab. sink: 72" x 24" x 10" inside, six legs, 4" work ledge, chrome trim, drain, duckboards, chemical-proof finish, perf. cond. Want good tape recorder, 15" Hi-Fi speaker, amplifier, three-speed changer, preamp-mixer, test equip. Roger M. Stern, 93 Nassau St., New York 38, N. Y.

SELL OR SWAP — Six 15 w. amplifiers P.P.6A3 output, made up in steel cases, $15 ea., or swap all for Precision E400 sweep gen. J. J. Natter, 142 - 12 168th Place, Jamaica 34, N. Y.

SWAP OR SELL — Parts and gear incl. WRL Globetrotter, Gonset 10/11, 6 ft. cabinet. Want test equip. and mobile gear. W. P. Keyes, 4330 Peterson St., Norfolk 13, Va.

SELLING OUT — Sams Photofacts 1 to 210; Riders 1 to 14; test equip., parts, tubes, books, magazines. Write for list. Daugherty Radio and TV, 1711 South Beckley St., Dallas 24, Tex.

SELL OR TRADE — Plate transformers (over 300 w.) rewound by professional, for cash, or amateur gear. Want HF 10-20, grid dip meter, antennascope, freq. meter. Jess Price, 411 Gunby Ave., Orlando, Fla.

SWAP — 250 Ma., 750 v. power supply, 811, 813, 810, and other tubes and parts for Kodak Retina or similar 35 mm. camera. Q. B. Dowdy, Box 712, Big Sandy, Tenn.

SELL — Homemade superhet (described in A.R.R.L., "How to Become a Radio Amateur") with tubes, power supply, instructions, schematic, 3.5 - 14.5 Mc. Logged 68 countries. Best offer. Louis Sander, Jr., 211 Henderson Rd., Pittsburgh 9, Pa.

SELL OR TRADE — Edwards FM tuner; 11-tube Gruno cabinet radio; wire recorder head and amp., make offer. Need PI or RI aircraft gen.; trumpet speakers; power tools. Roy Hughes, Route 13, Box 421, Birmingham, Ala.

FOR SALE — Late NRI radio and TV course; RCA conversion kit, CK-19, never used; National HF receiver; NC 156-1; Thorderson T-14556 trans. and 45551 15 H. choke matching. Make offer. Charles H. Johnston, 38 MacAlva Dr., Hampton, Va.

FOR SALE — Riders radio manuals 1 to 14 and 16, $75; Hickok sig. gen., model 180X, 100 Kc. to 120 Mc., 100 Kc. and 1,000 Kc. crystals, 0-10 Kc. sweep VU meter, 0-10 Kc. calibrated audio oscillator, $50. J. Doak, 1446 Kemble St., Utica 3, N. Y.

WANTED — Instructional manual or schematic for Solar Capacitor Analyzer, type CB-1-60. State price. Ken Palmer, 112 Lake Ave., Blasdell, N. Y.

SELL OR TRADE — Radio-TV News, Jan. 1951 to March, 1954; Radio-Electronics, Apr., 1951 to March, 1954; Service, Sept., 1952 to Dec., 1953; GE 210 AM-FM radio; NRI Multitester (AC converted). Make offer. Bruno DeCola, 379 S. Broadway, Salem, Ohio.

FOR SALE — Regency RC53 converter, used very little (local UHF station discontinued), $10 postpaid. R. P. McClintock, 4325 Wyoming St., Kansas City 11, Mo.

WANTED — Panadaptor, Stancor 202-A transmitter, tape recorder. H. E. Leigh, Sr., 197 North 14th St., San Jose 12, Calif.

FOR SALE — Riders Chanalyst, Hickok RFO-4 scope, Riders vols. 6 and 7, Precision 856 multimeter, Leeds and Northrup bridge I-49, Clough-Brengle model 23A resistor and cond. tester. Russell Hoskins, 305 E. Lennox, Yreka, Calif.

WANTED — In good cond.: "Radio and Tel. Mathematics," by Bernard Fischer, also late model of Hallicrafter or National short-wave set (1950 to 1954), with original wiring. Must be reasonable. R. Chlupsa, 45 - 56 189th Street, Flushing 58, N. Y.

SELL OR TRADE — Craftsman RC10 AM-FM tuner, Presto K-8 disc recorder, Radiotone RA-16 16" 2-speed disc recorder, R-J 8" speaker enclosure, etc. Want University CR paging speaker, B&W 400 distortion meter, ATR 12-RSC converter, Magnacorder plug-in equalizer. R. W. Jordan, Jr., WSBB, New Smyrna Beach, Fla.

FOR SALE — Radio, TV sales and service: established 5½ years; authorized Philco, Admiral, Motorola; stock and equipment. Gross $4,150 this year. Net price, $5,000. Write. Sadler Radio, Clayton, N. M.

SWAP — Riders AM-FM manuals vols. 15 to 20, perf. cond., for 5" scope. Give make and model number. Thos. M. Jones, 217 W. McArthur St., Corunna, Mich.

FOR SALE — Complete service shop incl. signs, clock, tubes, new test instruments, Photofacts, back issues of many trade publications, 5-vol. set Coyne Practical radio-TV course. Must sell immediately. Morris J. Unterweiser, 153 - 02 58th Rd., Flushing, N. Y.

WANTED — Coil sets for an HRO-5TA1 to cover broadcast band (550-1600 Kc.). Must be in good cond., and reasonably priced. Slutz, Bob's Radio Service, RFD 3, Salem, Ohio.

FOR SALE — Like new Webster 78 wire recorder, $50; good SP44 Panadapter, $50; homebuilt KW input telephone transmitter with spares, $300; good tubes: 246's, 35TG's, 250TH's, etc. Joseph F. Abate, Box 392, San Carlos, Calif.

SELL OR SWAP — Hallicrafters S-82; Astatic TV boosters; Precision E-400 sweep gen., and ES-500A scope; Gen. Ind. 2-speed recording chassis; Triplett 3415 tube checker, VTVM and sig gen.; Sams thru 225. Need photo equip. Ted Overbey, Box 794, Iowa Park, Texas.

FOR SALE — Like new 4½" 0-1 M.A. meter, 50-ohm internal resistance, in sq. bakelite case, with VOM scale, knife-edge pointer, $5.50 postpaid. L. Cohen, 151 - 09 34th Ave., Flushing, N. Y.

FOR SALE — Complete set, 30 pieces, first grade test equip., and library of Sams and Riders. Sell whole outfit only; prefer local, $1,100, terms. Write for list. Robt. Coffelt, 1414 Iron St., Bellingham, Wash.

WANTED — Used auto radio for 1953 Chevrolet with push-button control head. Carl Magrie, 633 Lillibridge, Detroit 14, Mich.

FOR SALE — RCA (UHF-VHF) converter; Philco 12½" table model TV; Admiral 10" table model TV. Good cond., priced reasonable. Joseph Harrison, 504 3rd St., Albany, N. Y.

FOR SALE — German made panel mount volt and ammeters, 2" to 5" diameter, like new. Write for details. Al Hart, 207 North Raymond St., Griffith, Ind.

WANTED — Portable 78 RPM, carrying case. Dewey Altizer, RFD 1, Centerburg, Ohio.

SELL OR TRADE — RME MC-53 2-6-10 m. 6 v. mobile converter, exc. cond. Cash or what have you? Albert Valunas, 10 Pine St., West Catasauqua, Pa.

FREE — Courses in radio and TV repairs. Register Sept. 13 and 14 from 7 to 9 p.m. at Queens Evening Trade School, 47th Ave. and 37th St., Long Island City, 1, N. Y.

WANTED — W.E. 9A transcription reproducer, with or without equalizer; also vertical transcriptions. Will pay cash if reasonable. J. Beaulieu, c-o CKAC, Master Control, Montreal, P.Q., Canada.

WANTED — Good audio generator, 20,000 ohms-per-volt VOM, sig. tracer, condenser checker, tweeter. Must be cheap, postpaid. R. B. Johnson, 3922 West 108th St., Inglewood, Calif.

TRADE OR SELL — Heath grid dip, l. n., for old Sylvania scope 132. Need not be in working cond. S. D. Raby, 6817 Harrisburg, Houston 11, Tex.

WANTED — Hammarlund kit of 4 ribbed plug-in coils known as SWK-4, two winding, cover range 1070 to 18,000 Kc. Chester Wegrzynowski, 51 North Central St., Buffalo 12, N. Y.

SELL OR SWAP — Scope; sig. gen.; Mossberg .22 repeating rifle; adding machine; 16 mm. silent projector and 2,000 ft. film; record changer; tubes; ATR inverter. E. G. Bartlett, Atlanta, Mo.

SWAP — Like new B & W CX95C with mounting brackets and 3221 jack bar. Want Electro-Voice SP12-B spkr.; also National PW-0 drive mechanism for NPW-0 drive unit. B. F Auvenshine, 1215B Brackenridge Apts., Austin 3, Tex.

FOR SALE — 3AP1, 3BP1 tubes; misc. oil condensers, 600 to 10,000 v.; 6.3 v. transformers to 10 amps.; other transformers to 2,500 v.; UTC PVM-3 output. Lexington Electronic Laboratory, 3 Sunny Knoll Ave., Lexington, Mass.

SELL OR TRADE — RCA 16" console TV model TC 166, good cond., $85; Simpson volt-ohm-ammeter model 260, $26 or will trade for 6 and 12 v. battery eliminator and charger. Hy Levine, 243 Heyward St., Brooklyn 6, N. Y.

FOR SALE — Power supply for medium sized transmitter, 1000 v. DC at 400 Ma. — 12 v. DC at 12 amps. — 12 v. DC at 2 amps. Prefer buyer to pick up because of weight. Best offer. Thomas Valenti, 1539 Curry Dr., Lyndhurst 24, Ohio.

WANTED — Electronics magazine back issues from 1940 to 1945 and Jan., Feb., and March, 1946; electric calculating machine, preferably Friden. State price or equip. desired in trade. G. J. Wendelken, 201 West 109th St., New York 25, N. Y.

FOR SALE — Heathkit test equip, factory tested and calibrated, A-1 cond; 5" scope; portable tube checker; vacuum tube voltmeter; sig. gen.; sig. tracer, 30,000 v.; DC probe, RF probe, low capacity probe. Andrew W. Perry, 9747 Shore Rd., Brooklyn 9, N. Y.

SELL OR TRADE — Webster 80 wire recorder, exc. cond., with 19 rolls wire, varying lengths. Cost $102., sell for $75 complete prepaid, or trade for good tube tester to check miniatures and rectifiers. Fred Schamn, 200 Third St., Liverpool, N. Y.

SELL OR TRADE — Three Fairchild 3-way professional transcription arms, l. n., model 200, net $65 each, sell all for $125, or trade for Bell 3-speed tape recorder, or Elmac PMR-6A receiver. Crum Sound, 751 North Central Ave., Chicago 44, Ill.

WANTED — Zenith transoceanic portable, advise model, cond., and price; AM-FM radios, prefer Zenith. Cabinets must be clean and chassis in fair cond. Mercury Radio Service, 433 South Wabash Ave., Chicago 5, Ill.

WANT — KW final plate power supply or KW final complete with power supply, also KW modulation transformer or complete KW modulator in good cond. Tom mith, 1510 6th Street South, Fargo, N. D.

WANTED — Technical manual for ART-13 transmitter. Will pay cash. Norman Wehrli, Box 1247, Kilgore, Texas.

TRADE — SX42 Hallicrafter radio with matching speaker R42 in factory carton, needs alignment, for complete line of late model Precision test equip. H. C. Morris, 404 Second St., Shenandoah, Va.

WANTED — Case for Arvin radio, model 664A, chassis RE 206-1. B. F. Keller, 3001 Monroe Ave., Cleveland 13, Ohio.

FOR SALE — Riders vols. 1 to 14 complete, unabridged. Best offer takes. Walter Greenwood, 302 Columbia Street, Coulee Dam, Wash.

FOR SALE — Radio physics course, Ghirardi, second edition, good cond.; K. & E. slide rule No. 4058. Best offer. F. T. Ricciardi, 499 DeKalb Avenue, Brooklyn 5, N. Y.

SWAP — Have Speed-Graphic outfit, and Jap automatic pistol to swap for good communications receiver, TV test equip., or Rollei or Leica camera. F. W Nichols, 314 South MacArthur Blvd., Springfield, Ill.

SELL OR TRADE — Dunlap metal turning lathe; also Philco 10BPA tube in mounting frame with yoke and focus coil in place with matching horiz. output and linearity coil, $20. Want 5" or 7" popular make scope. McKinley's Radio and TV Service, Zebulon, Ga.

WANTED — Pair of tuner strips for Philco TV, model 49-1075 code 121 tuner for Channel 10, or will swap other strips for same except Channels 4 and 7. Emergency TV, 1050 Main St., Leicester, Mass.

FOR SALE — Hickok model 156 tracometer, factory overhauled with all cables, $75; Mackay 157BY liberty ship transmitter using pair 813's, $200. J. V. Stout, 4640 York Rd., Baltimore 12, Md.

FOR SALE — Unused prop pitch motor, $15; RCA dynamic mike 88A with 91B stand, $25; Astatic MU-2 crystal sound cell-type mike with stand, $15; power transformer 400 and 600 v. at 600 Ma., $8, etc. Robert Cobaugh, 29 - 29 213th St., Bayside 60, N. Y.

SELL OR TRADE — RCA test oscillator, type 167-B; TV boosters, $10 ea.; complete NRI radio - TV course; personal portable, 1. n. Want 7JP4 picture tube in good cond. Lionel Verble, Box 116, Vanduser, Mo.

WANTED — Sams Photofacts 1 to 175, with or without binders. A. F. Lukes, TV Center, Cresco, Iowa.

WANTED — Bunnell or equivalent type "Sideswiper" telegraphic key, any cond. Ronald H. Griffin, c-o The Robert Dollar Co., 50 Drumm St., San Francisco 11, Calif.

SWAP — RCA Chanalyst and RCA test oscillator, model 167B for ham gear or small TV set. Bob Bair, Route 1, Box 1089, Hood River, Oregon.

FOR SALE — Mon-Key, $22.50; Garrard RC-60 Intermix record changer, $15; extra cartridge, $2.50; GE 12 v., 12 amp. Tungar charger, $15; BC 645A, 450 Mc. Xmitter receiver, $10. Walt's Radio, 524 Locust Ave., Hillside, N. J.

FOR SALE — Hickok dynamic mutual conductance tube checker, Signal Corps model I-177, good working cond., with adapter for most 9-pin tubes, also latest charts, $30 FOB. Aaron D. Brooks, 209 West Collins, Midland, Mich.

WANTED — Supreme rddio and TV diagram manuals in good cond. Prefer to trade for parts or service equip., but have cash if reasonable. A. M. Bryan, 316 N.E. 13th Ave., Gainesville, Fla.

SWAP — Precision E-200C sig. gen., never used, for good late model tape recorder. Will pay cash difference if necessary. R. P. McClintock, 4325 Wyoming St., Kansas City 11, Mo.

SELL OR SWAP — Sams vols. 16 to 24 for Riders TV vols. 2 to 5 and 9 to 12. Must be good. Bayerkohler Electric Service, Lakefield, Minn.

WANTED — 3" TV set in operating cond. State price; Illinois area only. Thomas Radio Supply, 205 E. Main St., Urbana, Ill.

FOR SALE — 2 Philco 7001 VTVM, $30 ea.; RCA WV97A VTVM with probes, $50; 4 Heathkit 0-6 scopes, $39.95 ea.; instruments in good cond. TV Maintenance Co., 3017 Cleveland Ave. N.W., Canton 9, Ohio.

FOR SALE — Over 100 copies Radio-Electronics 1942-1952, $10 plus shipping. Want Sigma 4F relays, any cond. and resistance. J. A. Lazzeri, 300 North 8th St., Brooklyn 11, N. Y.

SELL OR TRADE — RME preselector, model DB-20; PolicAlarm FM receiver, 30-50 meg., model PR-31; Hallicrafters FM-AM chassis with 12" Jensen speaker; Heath sig. gen., SG1. All in exc. condition. Robert W. Peters, Lincoln Way, West Extension, Massillon, Ohio.

FOR SALE — Heathkit FM2 tuner, in A-1 cond., assembled, $20. Newton Center Radio Shop, 759 Beacon St., Newton Center 59, Mass.

SWAP OR SELL — 78 RPM changer; 1939 Ford, 1941 and 1947 Pontiac radios; 6 v. 110 v. AC inverter. Need: S-38, BC-348, grid dipper or ?? Stan, 2748 Meade St., Detroit 12, Mich.

SELL OR TRADE — Supreme model 504A tube and set tester, exc. cond., or will trade for Gonset mobile converter, or $50 cash. Eddie Gigliotti, 249 So. Main St., Bangor, Pa.

OFFERS WANTED — Test equipment: Precision E200C, E400, 612, 856; RCA WV97A, WR67A, WP25A; Sylvania 132; Heath 0 - 5; Approved A-460; Mallory 6-RS-10, instructions, leads included. All exc. cond. LOW, Mont Vernon, N. H.

WANTED — Moderate Hi-Fi system and/or record player with reasonable good audio. What have you? Cash. A. H. Davis, 2585 Sylvan Rd., Cuyahoga Falls, Ohio.

SWAP OR SELL — Simpson 488 TV field strength meter in A-1 shape. Joseph Czapracki, 391 E. Ridge St., Nanticoke, Pa.

FOR SALE — Riders manuals 1-5 abridged, 6-13 (9 vols.), $50; also vols. 11-12-13, like new, make offer. FOB. C. J. Probe, 300 W. Apsley St., Philadelphia 44, Pa.

WANTED — KW Final amp. with power supply, must be reasonable and in good cond. C. E. Combs, RFD 2, Bluff City, Tenn.

WANTED — RME 99 receiver. J. G. Cisek, 241 Myrtle Ave., Irvington 11, N. J.

FOR SALE — Several 10" and 12" TV sets at cost. Ace TV, 5341 Cordelia Ave., Baltimore 15, Md.

FOR SALE — Model 03 Heathscope. Never used, make offer. F. A. McGonigle, 927 Vandever Ave., Wilmington 2, Del.

FOR SALE — National NC-183, 1. n., $165; NC-108 FM monitor (rack panel), $50; Gonset 2-meter converter, $27; Harvey Wells deluxe bandmaster, like new, $95; Viking I, Xmtr., $185; SW-54, $30. J. R. Halchak, 7 Ellsworth Ave., Cambridge, Mass.

FOR SALE — RCA TV chassis, model T-164, exc. cond., less tubes, $20 COD. Prefer local trade. John Kozma, 1665 Stadium Ave., New York 65, N. Y.

FOR SALE — Riders manuals 1 thru 14. Make offer. Crose Radio Service, 102 North Clifton, Park Ridge, Ill.

FOR SALE — 3 Sela Hi-Fi stroboscopes, model A-40 with discs, like new, determining exact turntable speeds and that of rotating machinery, $3.95 postpaid. Joel Osofski, 835 East 170th, Bronx, N. Y.

SWAP OR SELL — National School Radio-TV course, complete, less kits, in A-1 cond., $20. Want Simpson VOM, model 260. State price and cond. William Massaro, 1555 Odell St., Bronx 62, N. Y.

FOR SALE — Complete BC-375-E radio transmitter, 7 tuning units, antenna tuning unit, and PE-73-CM dynamotor, all in orig. cartons; BC-348-R receiver, not modified; BC-654-A radio receiver and transmitter. A. R. Satullo, 2440 Kalama Ave., Royal Oak, Mich.

WANTED — National MB-40 turret. Will swap HV mica transmitting condensers, 813's, AC panel meters, Bell Xtal mike, HV Pyranol filter condensers. J. E. Struthers, Box 112, Morrisonville, N. Y.

POSITION WANTED — As apprentice in radio and TV. Finishing course with DeForest Institute. Or position as a cameraman or in studio control work. Nearby if possible. Joseph Renteria, 6 Ridge Rd., Lackawanna, N. Y.

WANTED — TV type rotator motor. Swap or cash. C. B. Kelley, 7204 Clovernook Ave., Cincinnati 31, Ohio.

WANTED — Heathkit sig. tracer and sig. gen., built-up or not. State cash price. Have two 5BP4 CRT. C. Gabler, 1307 Merriam Ave., New York 52, N. Y.

WANTED — UTC VM-4 modulation transformer in exc. cond. State price. Earl Abbott, Manahawkin, N. J.

SACRIFICE SALE — Hickok 547 tube tester $95; Vector slide rule $9; 7" TV, working, $25; Sutco converter and booster $27. Equip. guaranteed in exc. cond. FOB. Will consider swap for outboard motor or good rifle. J. Schwartz, 2370 Euclid Hts. Blvd., Cleveland Hts. 6, Ohio.

SELL OR SWAP — Heath sweep gen. $40; Heath 5" scope $40; Philco projection tube TP400 $30; Silvertone AM-FM radio; Philco 7" TV table model. Want short wave receiver, outboard motor, good typewriter, or ?? Anthony Wilczynski, 3223 Unruh Ave., Philadelphia 49, Pa.

WANTED — Crystal diodes, transistors, chokes, padder condensers, wire, sizes 24 to 30 cotton covered, SCR625 mine detector. Will swap sign painter's letter patterns, many sizes. John Haynes, Doe Run, Mo.

FOR SALE — Silvertone wire recorder with built-in record player for recording, 117 v., 60 cycle, 95 w., very good cond., spool of 1 hr. wire included, $65 or best offer. Jos. A. Chukieski, RD 1, Ebensburg, Pa.

FOR SALE — TV sweep gen., RCA WA-59A, A-1 cond., $50; Superior TV gen., model TV-30, never used, $25. Sam's Television Service, 188 Main St., Everett, Mass.

SELL OR SWAP — 24 vols. Alexander Hamilton Business course, also 7" Teletone TV, and NRI communications course, less kits. Want 2-meter equip., mobile or fixed. Send full data. Bruce Opdenbrouw, 61 - 15 Success Park, Bridgeport, Conn.

SELL OR TRADE — Weston radio set tester, model 565 and two small radios for short wave Hallicrafter or National radio. Hy Knoller, 1590 East 22nd St., Brooklyn, N. Y.

SWAP OR SELL — Riders PA manual, RCA battery portable 10" and 12" CRT, Sprague Telohmike 16, Mall 6" saw. Want comm. receiver, electric oven for metals, VOM, 20K per volt, 10 meter ham rig. TV of Nassau, 11 Brooklyn Ave., Westbury, N. Y.

WANTED — 110 v. AC generator, 1500-2000 w., must be in good cond. and reasonable. State make, model, size, age, price. Baum-Nash Sound Service, 405 Main Street West, Rochester, N. Y.

FOR SALE — EMC model 300 V.T. volt-ohm-capacity tester, factory wired, like new, complete with 3 probes. Cash only. Ralph Vignola, 73 - 20 Juniper Valley Rd., Middle Village 79, Queens, N. Y.

WANTED — Partner, part or full time in new radio shop, College Park, Md. No investment, all test equip. installed, start after Labor Day. K. H. Stello, 823 Chillum Rd., Hyattsville, Md.

TRADE — Hickok model 209 VTVM; Hickok combination VTVM and tube checker, model 510X; 6 v. battery eliminator ATR, model ELIA, for .22 rifle with telescope sight or what have you. Ray Siber, 2319 Bollinger Ave., Canton, Ohio.

SELL OR SWAP — Complete 450 w. phone/CW VFO controlled transmitter, 10M - 160M, rack mounted, $375 FOB. Will deliver within 100 miles if traded on smaller transmitter, as Viking I or II. T. Ralph Johnson, 338 Hanover Ave., Allentown, Pa.

WANTED — Instruction manual for RCA Chanalyst, model 162; also information and schematic diagram for Philipps type 208U radio, made in Holland. Will pay your price. John A. McGregor, 4658 West 83rd Pl., Chicago 29, Ill.

FOR SALE — 7" Eico scope, model 470, almost new with lo. cap. probe., expertly wired, with all molded condensers and sockets, $98. Local deal preferred. Harold Heurung, 1216 Currie Avenue North, Minneapolis 3, Minn.

SELL OR TRADE — Astatic CT-1 booster, like new. Want RCA WV87A voltohmyst, Hickok 209A, UHF converter, S-40-A. J. W. Landon, Wayne, W. Va.

SELL OR SWAP — Unused Heath model V-6 vacuum tube voltmeter, assembled, for cash or swap for Heath sig. tracer T-3, signal gen. SG-8, TV sweep alignment gen. TS-3 in kit form or what have you? Pederson Radio Service, Walnut Grove, Minn.

WANTED — Operating instruction manual for Solar model CE capacitor analyzer. Joseph Crisafi, 46 - 16 49th St., Woodside, L. I. 77, N. Y.

WANTED — RCP Servishop or similar tester; 8 x 35 binoculars; portable typewriter. Have good trade articles or cash. Grey Mather, 722 Charlotte St., Utica 2, N. Y.

SELL OR SWAP — 8" tilt table Dunlap power saw and 18" Dunlap jig saw. Want radio test equip. Harold Doff, 341 East 51st St., Brooklyn, N. Y.

FOR SALE — Oscillograph 5" Dumont, type 274, used very little, complete with tubes and instruction manual, $50. Roy Randall, Box 451, Hobe Sound, Fla.

FOR SALE — Superior signal tracer, 1. n., $5; Weston oscillator, model 662, $5; National TV booster $5. Horace O. Pease, 144 Manson Ave., Kittery, Me.

FOR SALE — Wired Heathkit model A-9A Hi-Fi amp., $25; Jensen bass reflex mahagony enclosure and 8" Permoflux speaker, $40; RCA "45" changer, $12; all like new, FOB. H. Gehring, 1200 Stockwell Blvd., El Paso, Tex.

FOR SALE — Seletron-Selenium Rectifier, 6 v. 18 amp. capacity, full wave, 1. n., $10; Eldico TR 75 TV transmitter, 60 w. input, 80 thru 10 meters, $55 with 2 sets coils. Wm. Webb, 407 MacArthur Dr., Warren, Ohio.

SELL OR SWAP — Supreme sig. gen., and sig. tracer; Sprague Tel-ohm-mike; Sams manuals. Best price or part for good tube tester or what have you? K. Radziewicz, 846 Bergen St., Newark 8, N. J.

FOR SALE — Technical books: radio, photography, surveying, math, etc., and misc. radio parts and equip. Send stamped self-addressed envelope for list. Arthur Cherry, Jr., Box 65, North Branch, N. Y.

SELL OR SWAP — Jeanette 115 v. DC to AC rotary converter, 300 w. output, perf. cond. Need sweep gen. or battery eliminator for car radios. Ram TV, 356 Columbus Ave., New York 24, N. Y.

WANTED — Information regarding the mfg. company and operating instructions for Universal Dynamic Tracex Signal Tracer, model 501. Robert Gelnett, RD 2, Liverpool, Pa.

FOR SALE — Riders 7, 8, 14; Simpson model 269 VOM, like new, $85; BC-224; Jackson model 634 tube tester; 1939 Buick radio; home built electronic switch. M. Wolff, 1718 Moyer Ave., Elkhart, Ind.

FOR SALE — Precision E-200C sig. gen., never used, complete with cable and manual, $50. John W. White, 403 Sterling Ave., Winona, Miss.

FOR SALE — Heath VTVM, model V-5, complete with leads and instructions, very little use, $20. R. A. Staib, 1621 North Avers Ave., Chicago 47, Ill.

SWAP — PE-101C (converted) for BC-453 (any cond.), 454, 458, or 459. Bryon Fortner, RD 6, Box 370, Indianapolis 27, Ind.

SWAP — Complete darkroom of photo equip., for AM-FM tuner or Hi-Fi equip. John Hoernle, 632 Weiser St., Reading, Pa.

TRADE — Standard Underwood Pica Typewriter in good cond., for .22 pistol, 8 mm. camera, High Impedance mike, or what have you? Russell Rhodes, 510 South Glasgow Dr., Dallas 23, Texas.

FOR SALE — Monitor Crystaliner, 10 fundamental frequencies plus jack for external crystal, like new, $30. J. A. Desbiens, 1460 Stafford Rd., Fall River, Mass.

TRADE — Photo equipment: flash bulbs, spotlite, flash gun, lab scale, 4 x 5 film tank, 16 x 22 Arkay dryer, chemicals, etc., for comm. receiver. L. F. Smith, 726 Rutherford Ave., Lyndhurst, N. J.

FOR SALE — 733D receiver, very good cond., complete with tubes, control box, plugs, schematic, dynamotor, etc., $25 cash FOB or trade. M. E. Radio and TV, Box 6042 Ess, Flint 6, Mich.

WANTED — Used receiver National type NC-173 and schematic. Harold E. Wright, 46½ East Main St., North East, Pa.

FOR SALE — Ten meter Master mobile whip and mount (stainless) $9; AC-DC Teleplex code machine with tape cutter and 5 practice tapes, exc. cond., $40; Heath SG 6 RF sig. gen., $15. A. Hanson, Costas Trailer Court, Route 46, Lodi, N. J.

FOR SALE — Meissner disc recorder model 9-1065 with radio and PA, 2-speed, 33 and 78, perf., $60. Also Bell 3-speed tape recorder, model RT65B, $80. Cy Plotkin, 11 Landfield Ave., Monticello, N. Y.

WANTED — Model 11-A Waterman 3" scope, will pay cash. S. Wellenc, 256 12th, North Tonawanda, N. Y.

FOR SALE — 20 binders for Sams Photofact folders all like new. Make offer. Radio TV Service, 684 Blvd., Bayonne, N. J.

FOR SALE — All types of test equip., TV, radio and amateur radio parts, in good cond., radio and TV magazines, to date, NRI Service course. Write for list. R. F. Van Antwerp, 6907 52nd Terrace North, Birmingham, Ala.

SELL OR TRADE — Webster-Chicago wire recorder in good cond., and/or Wilcox-Gay model 1-C-10 disc recorder in operating cond., for BC-693 receiver, or BC-221, or what have you? William E. Hobson, 733 South Potomac, Hagerstown, Md.

FOR SALE — Used picture tubes: 2 12LP4, 10FP4 and 10AP4, good cond., $25 complete; 150 radio magazines dating from 1936 $8; 6 Gernsback official radio service manuals, 1932 - 1936, $2 each, $10 complete. You pay charges. Rudolph Chaloupka, Jr., Box 167, Oak Forest, Ill.

FOR SALE — 3" panel meter 0-1000 v. (5 mil. movement), $2.50; 2" Weston panel meter, 2 ranges 0-1½ v. and 0-140 v., $3; 145 mil. power transformer, 5 and 6 v. filament windings, high quality, $4. F. Maher, 2548 Fernwood Ave., Roslyn, Pa.

WANTED — Combination work bench and tool cabinet type 41-C-15, with laminated wooden bench top 27" x 28", 30" high, wide top drawer and two vertical rows, 5 each of ten drawers. Once available from Army surplus. Francis N. King, 8166 Riverview Road SE, Washington 21, D. C.

SELL OR TRADE — ARC-5 receivers 10-40-75 meters with tubes, $12 ea.; BC-659 transceiver with tubes $15; SCR 522 dynamotors $2.50 each; PE73 1000 v. dynamotor $5. Want Gonset 3-30 convertor. W. Davis, 4738 Adenmoor Ave., Lakewood 11, Calif.

FOR SALE — Good Dumont model 274 5" scope, $55; Approved model A-800 Hi-Fi pre-amp, perf., $25; University model 4401 tweeter and model 4405 hi-pass filter, both for $10. Write first. Want HF 10-20. M. Weinberg, 987 E. 178th St., New York 60, N. Y.

FOR SALE — Late model HQ-129X with speaker, $135; Lettine Xmtr., CW-phone 45 w., separate VFO, antenna tuner, mike, 80-40-20 coils, $90. Both exc. cond. J. Nantz, 39 Quarry Lane, Levittown, N. Y.

TRADE — Perfect 15" 25 w. speaker in bass reflex cabinet and 12 w. amplifier in kit form with all parts, for canoe or Bell tape recorder in perf. cond. Wesley Wiemers, Jr., Sanatorium, Miss.

FOR SALE — Heathkit sig. gen., model SG-8; completely wired and calibrated, includes test leads and instr. manual, A-1 cond., $30 COD insured. Charles Bailey, 401 Denton Way, Santa Rosa, Calif.

WANTED — Electro-Voice carbon mike, model 210-L and Electro-Voice model 726 "Cardyne I". Ed Kaphingst, 958 South Robert, St. Paul, Minn.

TRADE — Revere T-100 tape recorder for good 3-speed disc recorder. Give make, model, and cond. Stuart Woldman, 3445 Superior Park Drive, Cleveland Heights, Ohio.

FOR SALE — Radio Craftsman Hi-Fi, 5 tube, 10 w. amplifier, $24.50; Altec-Lansing Hi-Fi model 400-B spkr., $16.50; GE reluctance pickup arm and cartridge with GE pre-amp, $6.50. All like new. FOB. M. A. Porter, 1709 N. Larrabee St., Chicago 14, Ill.

SELL OR SWAP — BC-1306 Xmitter and receiver (covers 3800 to 6500) with 6-12-24 v. vibropack supply, in good cond. Want 10 meter transmitter for mobile work, with supply, or what have you? H. W. Fleischut, 312 West Railroad St., Pottsville, Pa.

TRADE — Perfect Crown Rotor, Electro-Voice TV distribution system, assorted boosters, for Riders manuals and Sams Photofacts. Geo. Ayoub, 1430 Wyoming St., El Paso, Texas.

FOR SALE — Heath sig. gen., with table and instruction book, $10; Heath TV sweep gen., cable and instruction book, $20. A. Agostino, 223 So. Winebiddle Ave., Pittsburgh 24, Pa.

FOR SALE — Craftsman C-10 tuner, C-500 amp., University 6201 spkr., Electro-Voice Aristocrat, blonde spkr. cabinet. All perf. cond. Sacrifice for $225 shipped postpaid and insured. H. Malamud, 122 Eames Place, Bronx 68, N. Y.

FOR SALE — Jackson sig. gen., model 640, $27; Rider Chanalyst, $68; Eico 425 scope, wired, $42; Superior TV-11 tube tester, $44; Jackson model 109 VTVM, $34; Heathkit A-9B wired Hi-Fi amp., $35. Eggen Radio, Grafton, N. Dak.

WANTED — ARC-1, ARC-3, ART-13, ATC, RTA-1B, R5/ARN-7, ARN-5, etc. Highest prices paid. Tom Allen, 159 Carlton Ave., Brooklyn 5, N. Y.

WANTED — Motorola 7" TV set in working order. Will swap KW ham radio parts for anything of value. Upp Radio Service, Box 325, Salida, Colo.

SELL OR SWAP — Gonset triband converter; Stancor ST-203A Xmitter, complete, Master Mount Hallicrafter S-40A. Want good scope, sweep gen., cash. Robert F. Faeth, 11 Godfrey Terr., Glen Rock, N. J.

WANTED — Lampkin 105-B and 205. Chief Engineer, WTSB, Lumberton, N. C.

FOR SALE — Power supply, 1750-0-1750 v. AC, 400 Ma. DC CCS, $50; transformer with 220 v. AC, pri.; Kenyon T-521 choke, $8; relays with 30 v. DC coils, $1 each. Harry E. Wood, 451 Manor Rd., Hatboro, Pa.

TRADE — 2 "How to Make Your Own Tape Recording Heads," has drawings, diagrams, instructions. Trade for used table radios. Geo. Anglado, 719 Dorries, Biloxi, Miss.

WANTED — Used Admiral or National 7" TV in working cond., New York area, for $20 or less. J. J. Bobrow, 104 - 21 191st St., Hollis 12, N. Y.

FOR SALE — National Radio Institute radio and TV servicing course, 65 lessons; also NRI radio and TV comm. course, 78 lessons. Best offer. R. Thomas Burns, 8561 Water Oak Road, Baltimore 4, Md.

SELL OR RENT — Very small service shop with quarters, in California's best climate. Write for details. Radio, Route 1, Box 76, Elsinore, Calif.

SELL OR SWAP — 10" TV set, auto set, radios and parts, tubes, test equip., for what have you? Send list. C. Bufano, 185 North 15th St., Bloomfield, N. J.

WANTED — Books by Chester Dawes, "Electrical Engineering," vol. I, Direct Current and vol. II, Alternating Current. Write stating cash price. Warren S. Gilman, Winter St., Tilton, N. H.

SELL OR SWAP — BE-3, 6 v., Heath battery eliminator, exc. cond., $18. J. Picardi, 1225 Packer St., McKeesport, Pa.

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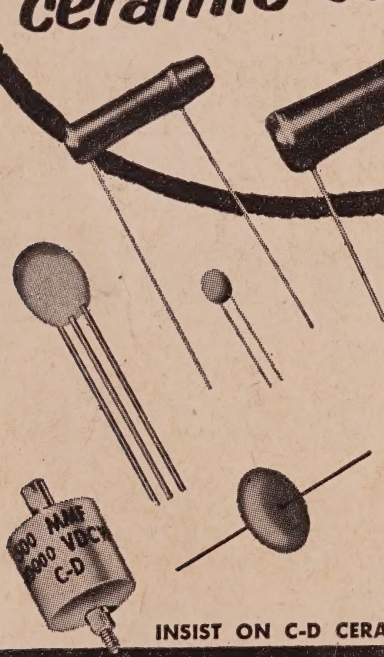

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